

# FX3 series lineup complete!

With the launch of FX3S, Mitsubishi's FX3 series line of microcontrollers is finally completed. Whatever your requirements may be, you will be sure to find just the right PLC you need. Push the limits of control with FX3 series PLCs.

**Functionality**

**High-end**  
**FX3U FX3UC**  
 Superior speed, power, and flexibility. Realize high speed control, network support, data logging, and more.

**Standard**  
**FX3G FX3GE FX3GC**  
 From automation to network, to more advanced control. Supports features required for basic control and a variety of applications.

**Entry level**  
**FX3S**  
 Simple and cost effective. Basic model that supports analog and communication expansion. Perfect for simple automation tasks.

**Control size**

| FX3 series overview        | FX3S <small>NEW</small>                       | FX3G   | FX3GE <small>NEW</small>                     | FX3U                                |
|----------------------------|---|--|--|-------------------------------------|
| <b>Main unit I/O</b>       | 10/14/20/30 I/O                               | 14/24/40/60 I/O                                    | 24/40 I/O                                    | 16/32/48/64/80/128 I/O              |
| <b>Control size</b>        | Max. 30                                       | Max. 128<br>(Max. 256 with CC-Link)                | Max. 128<br>(Max. 256 with CC-Link)          | Max. 256<br>(Max. 384 with CC-Link) |
| <b>Terminal</b>            | Screw   | Screw  | Screw  | Screw                               |
| <b>Power supply</b>        | AC  | AC/DC  | AC   | AC/DC                               |
| <b>24V DC input</b>        | Sink/Source                                   | Sink/Source  | Sink/Source                                  | Sink/Source                         |
| <b>Output</b>              | Relay/Transistor                              | Relay/Transistor                                   | Relay  | Relay/Transistor                    |
| <b>Shipping approvals</b>  | —   | ✓  | —  | ✓                                   |
| <b>Internal memory</b>     | 16k steps EEPROM<br>program memory : 4k steps | 32k steps EEPROM                                   | 32k steps EEPROM                             | 64k steps RAM                       |
| <b>RTC</b>                 | Built-in                                      | Built-in   | Built-in                                     | Built-in                            |
| <b>Battery</b>             | —   | Option   | Option                                       | Built-in                            |
| <b>Communication ports</b> | USB, RS-422                                   | USB, RS-422  | USB, RS-422, Ethernet                        | RS-422 (USB option)                 |
| <b>High speed counters</b> | 1 phase<br>60kHz : 2<br>10kHz : 4             | 1 phase<br>60kHz : 4<br>10kHz : 2                  | 1 phase<br>60kHz : 4<br>10kHz : 2            | 1 phase<br>100kHz : 6<br>10kHz : 2  |
| <b>Positioning</b>         | 2 axes<br>100kHz                              | 14/24 I/O : 2 axes<br>40/60 I/O : 3 axes<br>100kHz | 24 I/O : 2 axes<br>40 I/O : 3 axes<br>100kHz | 3 axes<br>100kHz                    |
| <b>Analog I/O</b>          | —   | —  | Input : 2    Output : 1                      | —                                   |
| <b>Analog volume</b>       | 2   | 2  | 2  | —                                   |
| <b>Expansion boards</b>    | 1   | 14/24 I/O : 1<br>40/60 I/O : 2                     | 1  | 1                                   |
| <b>Special adapters</b>    | 2   | 14/24 I/O : 2<br>40/60 I/O : 4                     | 2  | 10                                  |
| <b>Memory cassette</b>     | ✓   | ✓  | ✓  | ✓                                   |
| <b>Display module</b>      | —   | ✓  | ✓  | ✓                                   |
| <b>CC-Link V2</b>          | —   | ✓  | ✓  | ✓                                   |
| <b>MODBUS*</b>             | ✓   | ✓  | ✓  | ✓                                   |
| <b>Ethernet</b>            | ✓   | ✓  | —  | ✓                                   |
| <b>SSCNET III</b>          | —   | —  | —  | ✓                                   |

\*: Extension is possible.

## PROGRAMMABLE CONTROLLERS

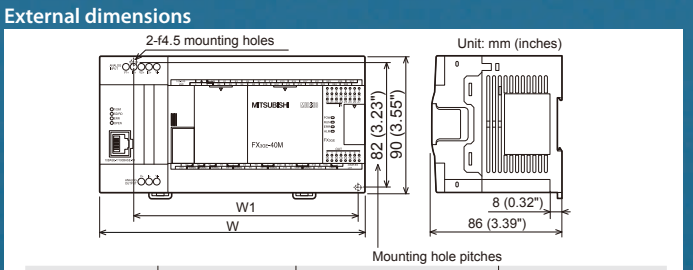
**General specifications**

| Item                         | Specifications   |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
|------------------------------|--|----------------------------------|---------------------|--|---------------------|--|----------------------------|----------|---|-------|-----------|-----|---|-------------------------|----------|---|-------|-----------|-----|---|
| Ambient temperature          | 0 to 55°C (32 to 131°F) when operating and -25 to 75°C (-13 to 167°F) when stored  |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Ambient humidity             | 5 to 95%RH (no condensation) when operating  |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Vibration resistance*        | <table border="1"> <thead> <tr> <th></th> <th>Frequency (Hz)</th> <th>Acceleration (m/s<sup>2</sup>)</th> <th>Half amplitude (mm)</th> <th rowspan="4">Sweep Count for X, Y, Z: 10 times (80 min in each direction)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">When installed on DIN rail</td> <td>10 to 57</td> <td>—</td> <td>0.035</td> </tr> <tr> <td>57 to 150</td> <td>4.9</td> <td>—</td> </tr> <tr> <td rowspan="2">When installed directly</td> <td>10 to 57</td> <td>—</td> <td>0.075</td> </tr> <tr> <td>57 to 150</td> <td>9.8</td> <td>—</td> </tr> </tbody> </table> |                                  | Frequency (Hz)      | Acceleration (m/s <sup>2</sup> )                             | Half amplitude (mm) | Sweep Count for X, Y, Z: 10 times (80 min in each direction) | When installed on DIN rail | 10 to 57 | — | 0.035 | 57 to 150 | 4.9 | — | When installed directly | 10 to 57 | — | 0.075 | 57 to 150 | 9.8 | — |
|                              | Frequency (Hz)   | Acceleration (m/s <sup>2</sup> ) | Half amplitude (mm) | Sweep Count for X, Y, Z: 10 times (80 min in each direction) |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| When installed on DIN rail   | 10 to 57   | —                                | 0.035               |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
|                              | 57 to 150  | 4.9                              | —                   |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| When installed directly      | 10 to 57   | —                                | 0.075               |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
|                              | 57 to 150  | 9.8                              | —                   |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Shock resistance*            | 147m/s <sup>2</sup> Acceleration, Action time: 11ms, 3 times by half-sine pulse in each direction X, Y, and Z  |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Noise durability             | By noise simulator at noise voltage of 1,000Vp-p, noise width of 1ms, rise time of 1ns and period of 30 to 100Hz   |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Dielectric withstand voltage | 1.5kV AC for one minute  |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Insulation resistance        | 5MΩ or more by 500V DC megger  |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Grounding                    | Class D: Grounding resistance 100Ω or less   |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Working atmosphere           | Free from corrosive or flammable gas and excessive conductive dusts  |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |
| Working altitude             | <2000m   |                                  |                     |  |                     |  |                            |          |   |       |           |     |   |                         |          |   |       |           |     |   |

\* The criterion is shown in IEC61131-2.

**Power Supply Specifications**

| Item                                       | Specifications   |
|--|--|
| Power Supply                               | 100-240V AC (+10%/-15%), 50/60Hz                             |
| Allowable instantaneous power failure time | 10ms or less.  |
| Power fuse                                 | 250V 1A(24MR), 250V 3.15A(40MR)                              |
| Rush current                               | 30A max. 5ms or less/100V AC<br>50A max. 5ms or less/200V AC |
| Power consumption                          | 32W(24MR), 37W(40MR)   |
| 24V DC service power supply                | 400mA  |



| Model name    | w : mm(inches) | w1 : mm(inches) | Direct mounting hole pitches | MASS(Weight) : kg(lbs) |
|---------------|----------------|-----------------|------------------------------|------------------------|
| FX3GE-24MR/ES | 130(5.12")     | 105(4.13")      | —                            | 0.60(1.32lbs)          |
| FX3GE-40MR/ES | 175(6.89")     | 150(5.90")      | —                            | 0.80(1.76lbs)          |

• 35-mm-wide DIN rail or Direct (screw) mounting (M4)

**Specifications**

| Item                   | FX3GE-24MR/ES  | FX3GE-40MR/ES   |
|------------------------|--|---|
| I/O points             | 256 total (combined local and CC-Link remote I/O)                              | 256 total (combined local and CC-Link remote I/O)   |
| Address range          | Max. 128 direct addressing and Max. 128 remote I/O                             | Max. 128 direct addressing and Max. 128 remote I/O  |
| Program memory         | 32,000 steps EEPROM (internal), exchangeable EEPROM memory cassette            | 32,000 steps EEPROM (internal), exchangeable EEPROM memory cassette   |
| Instruction Time       | 0.21μs or 0.42μs / contact instruction   | 0.21μs or 0.42μs / contact instruction  |
| Number of instructions | 29 sequence instructions, 2 step ladder instructions, 124 applied instructions | 29 sequence instructions, 2 step ladder instructions, 124 applied instructions  |
| Programming language   | Step ladder, instruction list, SFC Step ladder                                 | Step ladder, instruction list, SFC Step ladder  |
| Program execution      | Cyclical execution, refresh mode processing                                    | Cyclical execution, refresh mode processing   |
| Program protection     | 2 different keywords, Max password length 16 characters *1                     | 2 different keywords, Max password length 16 characters *1  |
| Inputs                 | Number of input points   | 14  |
|                        | Input signal voltage / form  | 24V DC +10%, -10%, Sink / Source  |
| Outputs                | Input signal current/impedance   | X000 to X007 : 7mA/24V DC, 3.3kΩ / X010 or more : 5mA/24V DC, 4.3kΩ   |
|                        | Number of output points  | 10 points (16 points)*2   |
| Analog inputs          | Output type  | Relay   |
|                        | External power supply  | 30V DC or less, 240V AC or less*3   |
| Analog outputs         | Max. Resistance load   | 2A : 1point common, 8A : 4points common   |
|                        | Input range  | Voltage input : 0V to 10V DC, 198.7kΩ(Max. -0.5V, +15V)<br>Current input : 4mA to 20mA DC, 250Ω(Max. -2mA, +30mA)         |
| Ethernet               | Resolution   | Voltage input : 2.5mV (10V/4000), Current input : 5μA (16mA/3200)   |
|                        | Output range   | Voltage output : 0V to 10V DC (External load: 2k to 1MΩ)<br>Current output : 4mA to 20mA DC (External load: 500Ω or less) |
| Ethernet               | Resolution   | Voltage input : 2.5mV (10V/4000), Current input : 4μA (16mA/4000)   |
|                        | Data transmission speed  | 100Mbps / 10Mbps  |
|                        | Communication method   | Full-duplex / Half-duplex   |
|                        | Transmission method  | Base band   |
| Ethernet               | Maximum segment length   | 100m (328')   |

\*1: 8-character keyword  
 \*2: Each value inside ( ) indicates the number of occupied points.  
 \*3: Between 250V and 240V CE are not compliant.

| Item                                      | Specifications  |
|---|---|
| Auxiliary relays                          | 7,680 total, with 384 general (M0 - M383), 1152 EEPROM latched (M384 - M1535), and 6,144 general/optional latched (M1536 - M7679) |
| Special auxiliary relays                  | 512 (M8000 - M8511)   |
| State relays                              | 4,096 total, with 1,000 EEPROM latched (S0 - S999) and 3,096 general/optional latched (S1000 - S4095)                             |
| Timers                                    | 320 total, with 206 100ms (T0 - T199 and T250 - T255), 46 10ms (T200 - T245), and 68 1ms (T246 - T249 and T256 - T319)            |
| External setpoint entry via potentiometer | 2   |
| Counters                                  | 235 total (16 bit and 32 bit), with 36 general (C0 - C15 and C200 - C219) and 199 EEPROM latched (C16 - C199 and C220 - C234)     |
| High-speed counters                       | 21 total, with 16 1-phase (C235 - C250) and 5 2-phase (C251 - C255)   |
| High-speed counter speed                  | 1-phase, 6points max: 60 kHz / 4points, 10kHz / 2points<br>2-phase, 3points max: 30 kHz / 2points, 5kHz/1point                    |
| Real-time clock                           | Year, month, day, hour, minute, second, day of the week   |
| Data registers                            | 8,000 total, with 128 general (D0 - D127), 972 EEPROM latched (D128 - D1099), and 6,900 general/optional latched (D1100 - D7999)  |
| Extension registers                       | 24,000(R0 - R23999)   |
| Extension file registers                  | 24,000(ER0 - R23999) internal/optional memory   |
| Index registers                           | 16  |
| Special data registers                    | 512 (D8000 - D8511)   |
| Pointers                                  | 2,048   |
| Nestings                                  | 8   |
| Interrupt inputs                          | 6   |
| Constants                                 | 16 bit: K-32,768 to +32,767; H: 0 to FFFF;<br>32 bit: K-1,247,483,648 to +1,247,483,647;<br>H: 0 to FFFF FFFF                     |



for a greener tomorrow

## PROGRAMMABLE CONTROLLERS

# All-in-one standard including analog and network features

MELSEC-F  
**FX3GE**  
 Debut!



**⚠ Safety Warning**  
 To ensure proper use of the products in this document, please be sure to read the instruction manual prior to use.

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- MODBUS is a registered trademark of Schneider Electric SA.
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<http://Global.MitsubishiElectric.com>



# All-in-one standard! FX3GE

including analog and network features



## What's in the New FX3GE PLC!

FX3GE adds built-in analog input/output and Ethernet connectivity on top of FX3G performance. A great fit for many applications.

### Built-in analog input

- 2ch built in
- Voltage input
- 0-10V DC (Resolution 2.5mV (10V/4000))
- or
- Current input
- 4-20mA (Resolution 5µA (16mA/3200))



NEW FX3GE-40MR/ES

### Built-in analog output

- 1ch built in
- Voltage output
- 0-10V DC (Resolution 2.5mV (10V/4000))
- or
- Current output
- 4-20mA (Resolution 4µA (16mA/4000))



FX3GE-24MR/ES NEW

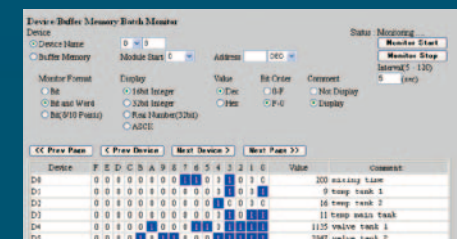
### Built-in Ethernet port

Supports remote monitoring and maintenance on high speed 10BASE-T/100BASE-TX communication



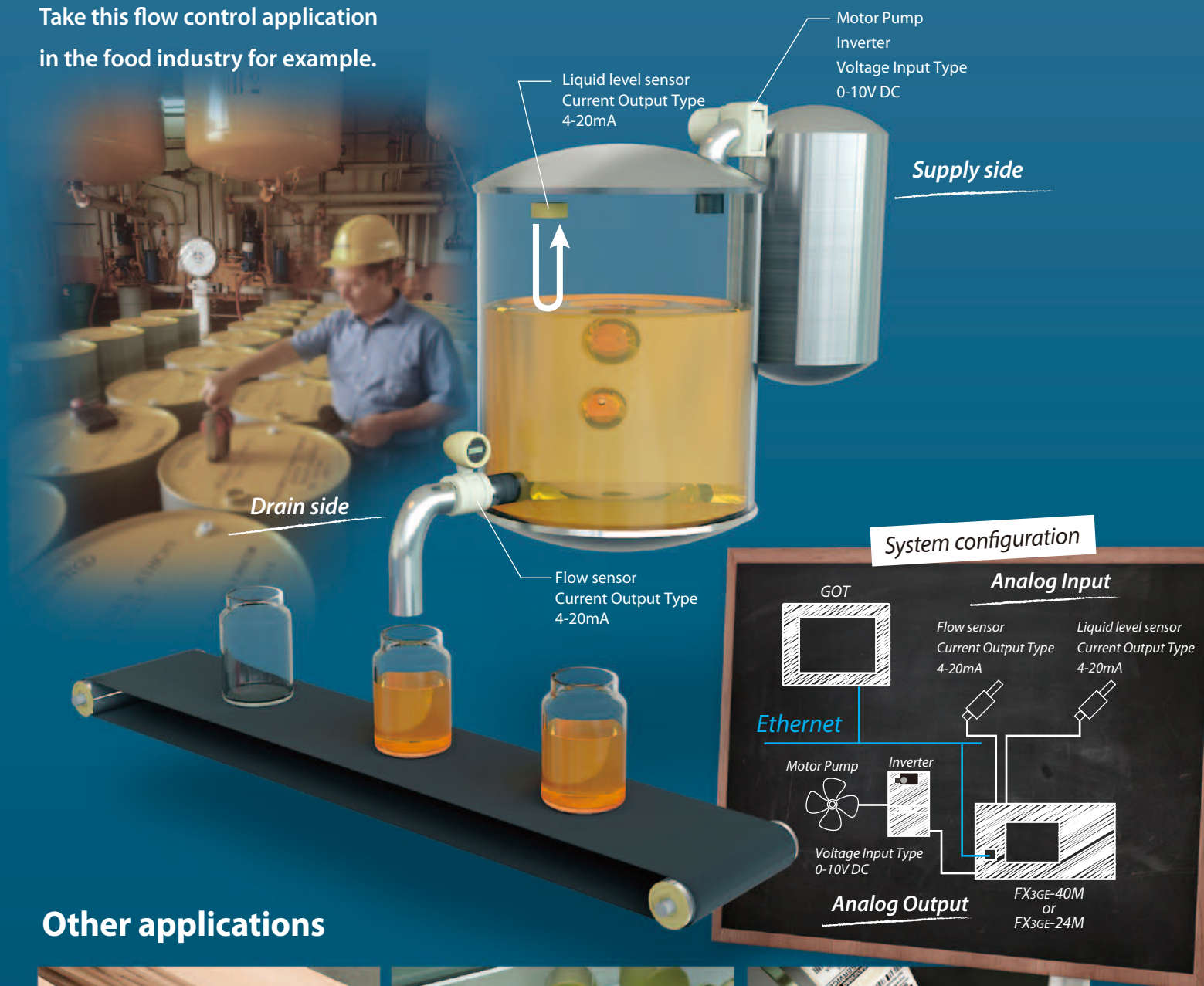
### Web based Data Monitoring

Read PLC information from any networked device with a standard web browser. For security, optional PLC keyword protections prohibit unauthorized access.



## Where can the new FX3GE PLC be used?

Take this flow control application in the food industry for example.



### Other applications



Smooth production control required for wood cutting machines



Analog data management for injection molding machines



Label printing machines with network functionality

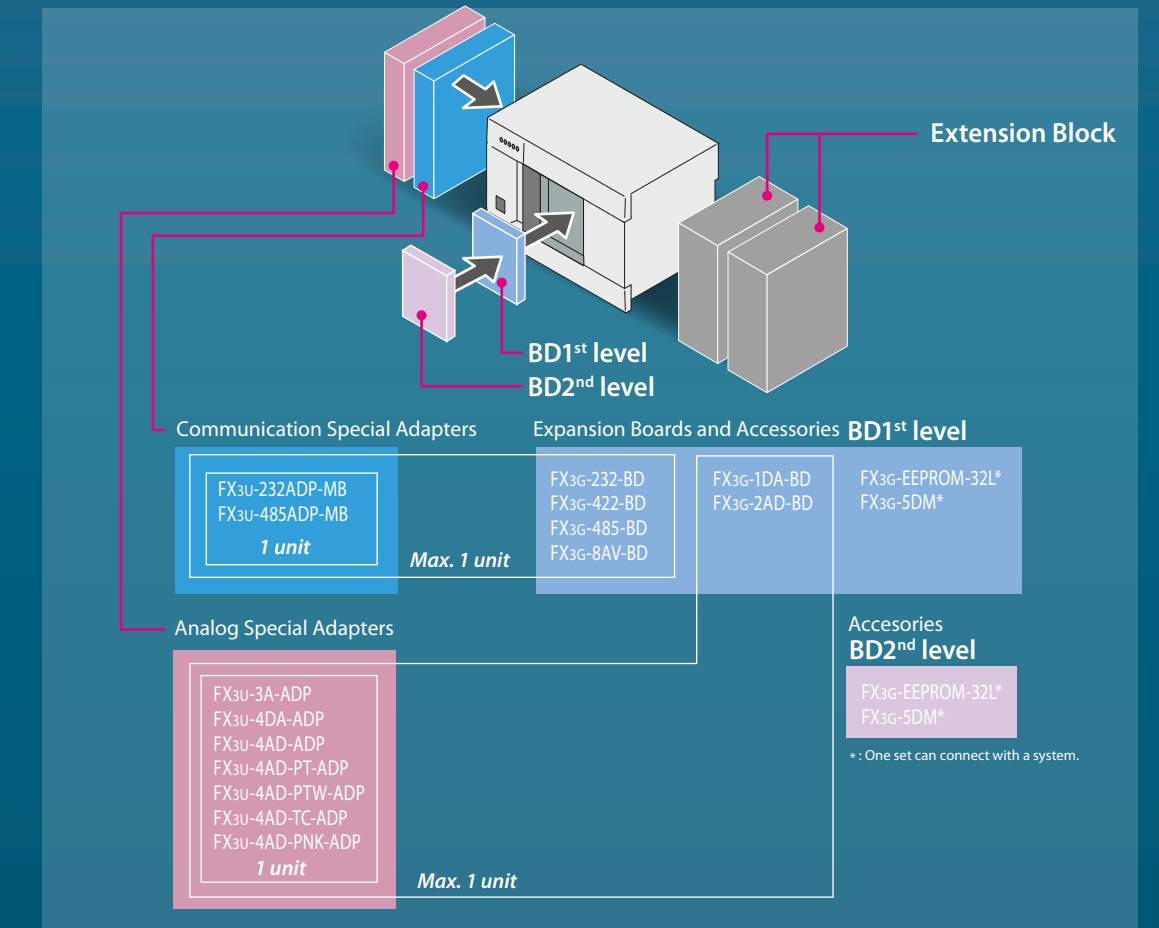
## Flexible Expandability

In addition to its built-in features, FX3GE also has a wealth of expansion options. Choose from the same options for FX3G/FX3U.

### Expansion boards and Special adapters Communication and analog special adapters

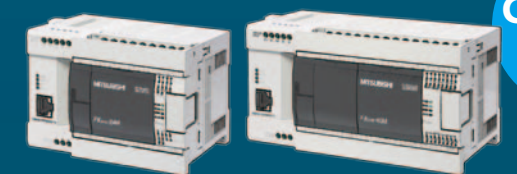
- 1<sup>st</sup> level : expansion board
- 2<sup>nd</sup> level : memory cassette or display module

One communication and one analog special adapter can be connected. However, special adapters and expansion boards cannot be used together.



## More FX3GE series

Look forward to transistor output models coming soon!



FX3GE Main units AC supply Transistor Output models  
 FX3GE-24MT/ES FX3GE-40MT/ES  
 FX3GE-24MT/ESS FX3GE-40MT/ESS

Coming soon!